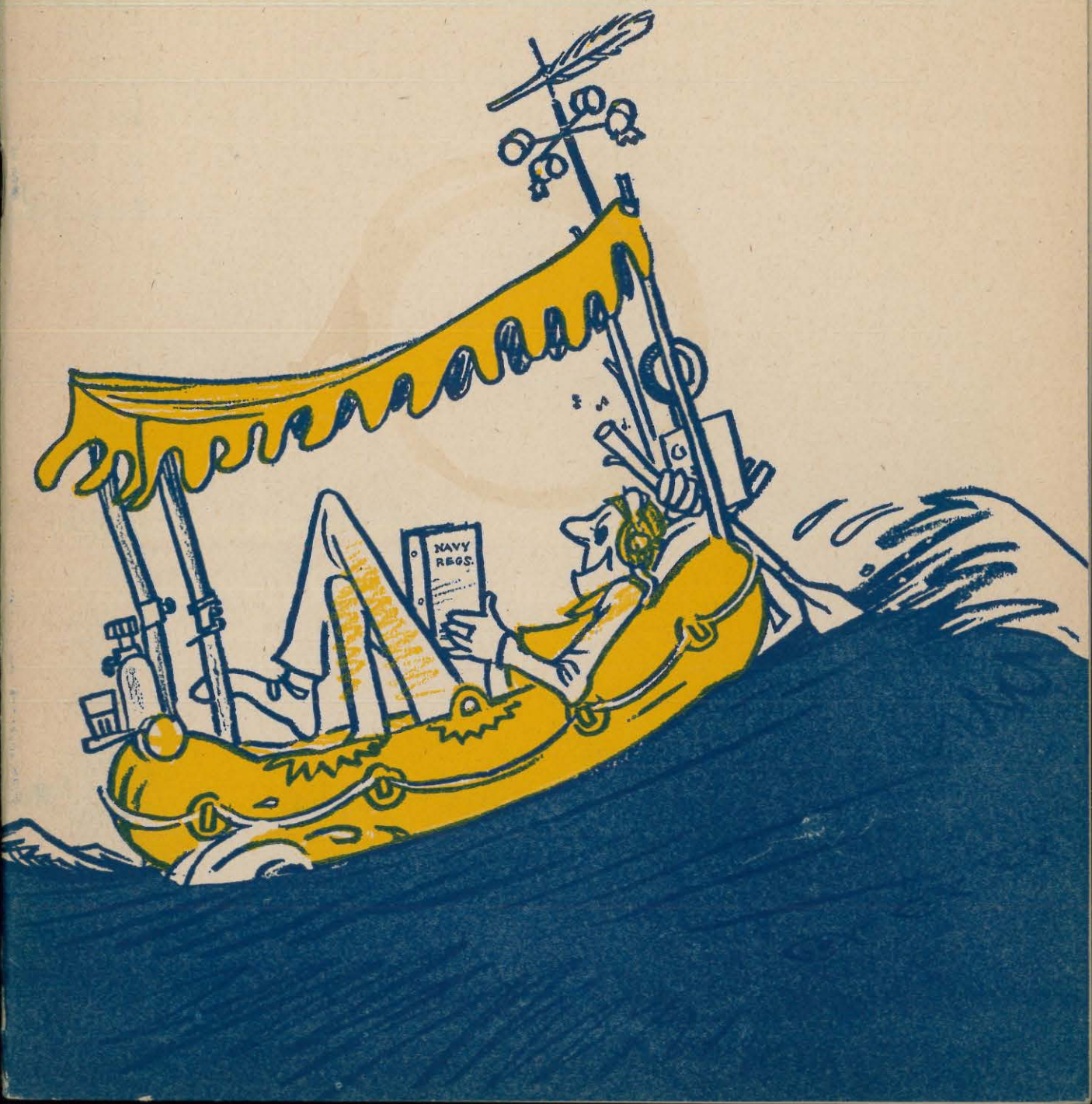
DUNKING SENSE



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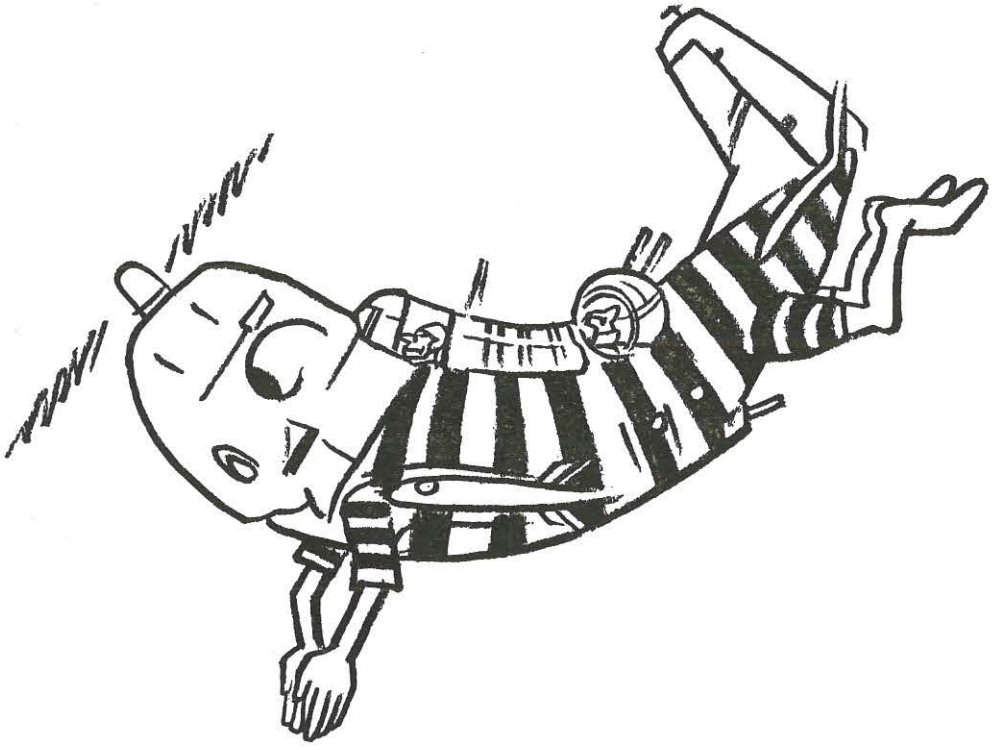

ISSUED BY
AVIATION TRAINING DIVISION
OFFICE OF THE CHIEF OF NAVAL OPERATIONS
UNITED STATES NAVY
1944

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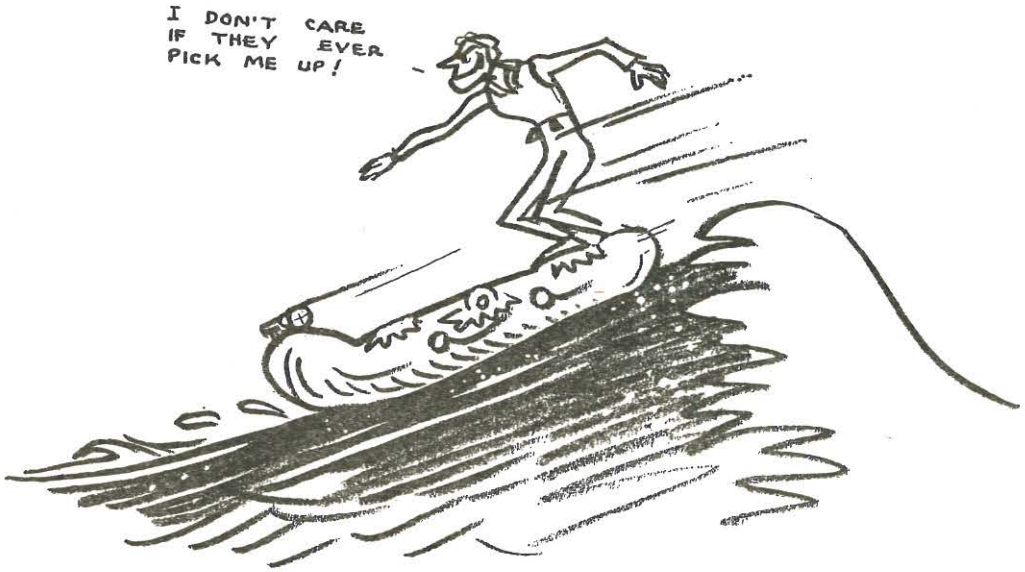

I DON'T CARE
IF THEY EVER
PICK ME UP!

DUNKING SENSE

Not every flyer goes rafting—most won't—but there will be enough pilots and air crews dunked into the briny deep to make it a sound idea to get the dope now—while you're dry.

Naturally most of us prefer to do our cruising at sea in an air-borne plane, rather than in a surface raft. Unfortunately, however, there is a bottom to all gas tanks and even occasionally a Nip may give you the wet seat. Or perhaps you're just plain lost.

That is just the time to steady down and take it easy. While you're still in the air check your navigation once more. Did you make an error? Is it too late to fly back to the location you should have been heading for all the time? It would be a big help to your base to receive your corrected position—they might even get a bearing from the transmission. All of this, of course, depends upon the tactical situation prevailing at the time.

If, however, it is obvious that shortly you are going to sit down in the drink, knock off worrying about it. Just because an impending father thinks his baby is to be the first one born is no proof that this is true. Plenty of pilots long before your time have landed in the water with little consequent trouble. Dozens of plane crews have been in a similar predicament with no unfavorable results.

So knock off stewing about it. If you've taken proper precautions to train each member of the plane crew, everything is in your favor.

Crash landing procedure has been carefully worked out and much time and thought have been spent in perfecting equipment to keep you afloat with reasonable comfort until you are picked up. It's not the Ritz, of course, but let's be grateful for small things! Your raft is a vessel which you can sail to safety. Every century has its tales of shipwrecks and small boat voyages. One great lesson stands out: *If you are determined to get ashore and go about it coolly and patiently, almost invariably you will survive no matter how great the difficulties.*

LOOK BEFORE YOU LEAP.

Are you the sort of fellow who dives merrily into an empty swimming pool, or who bails out at ten thousand feet only to have to go back for his parachute? If you are, don't read this little pamphlet. You will be more interested in shooting the breeze than in putting yourself to a little inconvenience that may save your life. But, if you are interested in old-age pensions, a recommended first step is to break out your raft and give it plenty of study. Learn

piece of equipment. The guys that are seriously interested in prolongevity personally check all their equipment to be sure it's there and in good working shape. Perhaps you can practice handling your raft in the water if you are somewhere where it's warm. It is well to know that the chromium reflector—maybe *you* call it a mirror—is intended to attract the attention of a plane overhead. Several crews might have had their ordeal cut short at the very beginning had they known where and what their reflector was, and how to use it.

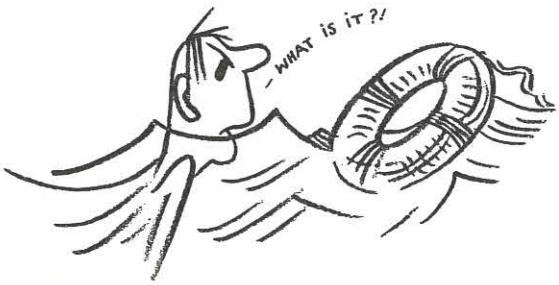
Learn where everything in the plane is stowed and be ready to reach for it without hesita-

tion, even in the dark. Decide what extras you will need, stow them and know where they are. Once aboard the raft and in need of something, you can't use it if it is:

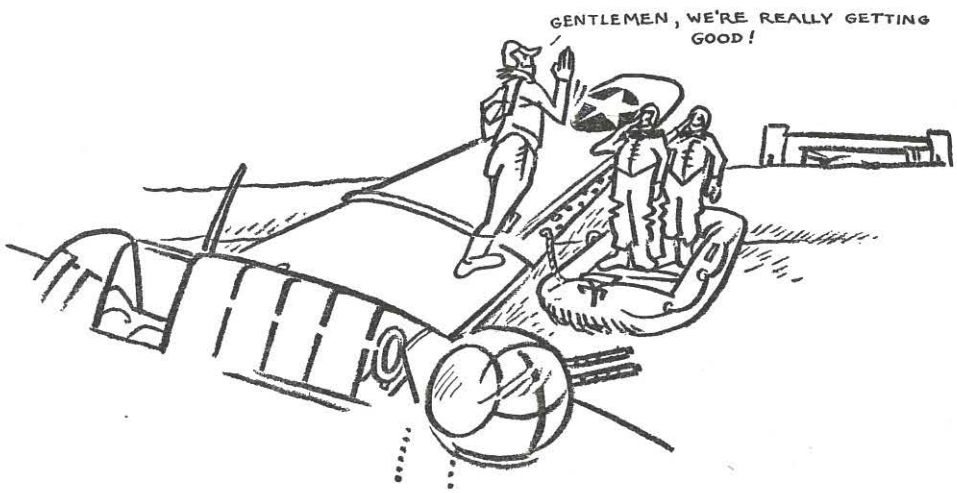
1. Ashore.
2. On the carrier.
3. On the plane which you have just abandoned as it sank.

The only place it is going to do you any good is aboard the raft and it isn't going to be aboard the raft unless you put it there.

WANT TO SAVE YOUR LIFE?



Drill—drill as a team—in getting the raft away complete with all its gear and all of you. Drill so that if one of you is injured, the other, or others, can do his job in addition to their own and get him away with them. It is not enough to practice in bright sunlight and in ordinary working clothes—you must be ready to work smoothly in pitch darkness, in freezing cold, hampered by gear stowed in confined spaces, dressed in full flying kit and connected to the plane by safety belt, interphones and oxygen tubes. Drill until doing the right thing is instinctive without orders other than "STAND BY TO DUNK." Then ask yourself questions as to what you would do under differing sets of circumstances and coordinate it with the rest of your crew. Last of all, drill some more.



THAT EMPTY FEELING.

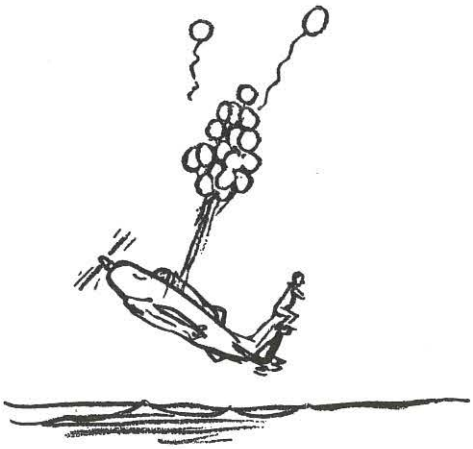
When you and the gas tanks share a mutual feeling of emptiness and the base seems out of reach, you can relieve your feelings by telling the rest of the crew of your situation. As a matter of fact, you *must* inform all hands, for the crew aft may have no inkling that a forced landing is impending. Once announced, preparation for dunking should start at once, particularly the radio procedure. If the existing directives permit, send a distress call off immediately giving the estimated position of landing. Don't remain silent until the last minute and run the risk of bad reception, or of not being able to get your message off at all. After all it can (and must) be canceled when no longer applicable.

If it's imminent fuel exhaustion that's bringing you down, don't wait until the engines sputter, but land while you still have power available, for the landing speed can be reduced considerably by using engines—and you can select your spot.

ON THE LIP OF THE CUP.

You may have some warning, but you won't have much. There won't be any time for a fight talk or a conference when the pilot gives the command "Stand by to dunk!" over the interphone. Either you have drilled or you haven't and here's where it shows up.

a. *The pilot* makes sure that his safety belt is fastened. His primary mission now is to set the airplane down safely. The danger is (in landplanes) that the plane will go over on its back, or nose down and dive. Both of these tendencies are caused by the drag of water on the underbody, particularly any projections, or by the entry of water through openings forward. Therefore he tries to land with the airplane *as light as possible, with the center of gravity as far aft as possible (without endangering stability), with landing gear retracted, with all openings (except forward and amidships upper escape hatches) sealed, and with the plane FULLY STALLED.*

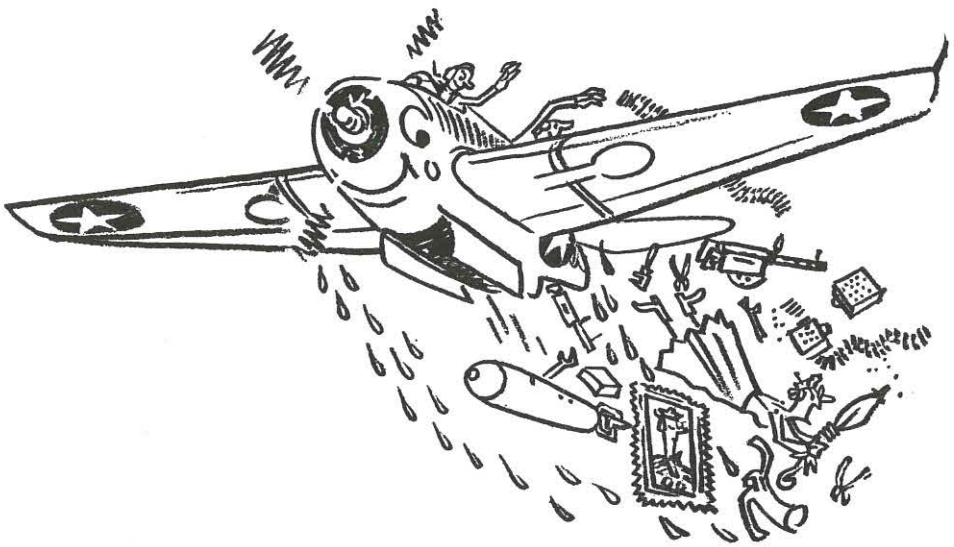


This last is so important with regard to landplanes that one pilot has been known to mutter to himself a short incantation:

"IF I'M TO LIVE UNTIL I'M BALD,
I'VE GOT TO LAND HER FULLY STALLED."

To place the plane into optimum landing condition:

1. All disposable load should be jettisoned, if time is available. This includes bomb load, excess fuel, armament, tools, armor (if removable), ammunition, miscellaneous equipment, and personal baggage. This affords you an excellent opportunity of getting rid of Aunt Mabel's picture in the plush and silver frame, and also of Aunt Mabel if she happens to be along.



2. Shift the center of gravity aft by dumping the forward fuel tanks where there is a choice, and by moving crew members aft. While dumping fuel, shut off electrical system to avoid igniting gas cloud and wait until you are sure you are clear before using radio.

3. Extend the flaps fully and land with flaps down in all types of aircraft. The retarding effect of the flaps on the landing speed greatly overshadows any increase in water drag, which will be only momentary, in any event, as the flaps generally carry away on impact with the water.

4. The pilot must use his head about jettisoning bombs. Landing with the bomb bay doors open would be fatal as the plane would probably flood and sink immediately, not to mention the disastrous effect of the snow-plow or scoop action of any underbody opening. Therefore be dead sure that enough time and altitude remain to open the bomb doors, drop the bombs, and get the doors closed again before you land. If you are doubtful, never mind the extra weight; land with your bomb load rather than land with open bomb bays.

5. As has been said already and as we are going to keep right on saying: "Don't forget to have your landing gear fully retracted."

SEA AND WIND.

Being a Navy man, you naturally know all about sea and wind—or do you? The pilot planning on a happy future takes into account that he may have to get intimately acquainted with salt water sometime during his career and always carries in the back of his head a sound plan for getting down as safely as possible. He checks regularly on the force and direction of the wind and the condition of the sea *before* getting into trouble.

Anyway, remember that when you dunk, the water may not be as calm or soft as it looked from way up in your usual element. In fact, if you hit it wrong the effect can be much the same as trying to fly through the Holland Tunnel. And getting down in the right direction is slightly different from coming in on a flight deck, because waves and swells are involved which can toss you around plenty.

There are no hard and fast rules for a good water landing; what counts is the pilot's ability to judge the situation and make the best approach possible under the circumstances. The *wind* is a controlling factor when it is so strong that a cross-wind landing is out of the question. With more than 20 knots of wind, landings should be made directly or almost directly into it despite the direction of swells that may be running. The slower landing speed thus afforded outweighs all other factors to be considered in making a safe sea landing. This old stand-by method of estimating wind speed may come in handy:

	Miles per hour
Calm sea with no waves (but watch for ripples)	0–10
A few scattered whitecaps	10–20
Many whitecaps	20–30
Streaks of foam in the water	30–40
Spray streaming from wave crests	40–50

Wind direction is indicated, of course, by movement of waves, which always break downwind, or from gusts of wind rippling the water in wide sweeps, or the course in which spray is blowing.

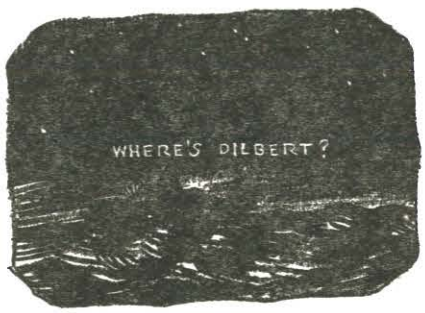
Don't be fooled by *swells*, which have no breaking crest. There is NO relationship between directions in which swells run and the way the wind is blowing. In fact, one of your little problems may be a cross sea in which the swells are running in one direction while a wind at an angle to the swells is pushing waves along them. Life gets very complex at times, and this is one of those times. However, when the wind is moderate and swells are strong, the plane should be put down along the swells—not against them—as nearly into the wind as possible under the circumstances. Some fliers have found landings along the trough to be satisfactory, particularly in high swells. On the other hand, if there is a strong cross wind, it's better to land into the wind, trying for the upslope toward the top of the swell.

Without swells, your problem is greatly simplified. Come down into the wind, even when the sea is quite choppy.

I'LL HAVE MINE BLACK!——

Most aviators are firmly convinced that forced landings occur at the time and place least convenient for all involved. Night and the cold, wet waters of one of the seven seas form a sufficiently obnoxious conbination. . . .

Swallow your hearts, dunkerees. It's not as bad as it sounds.



Night forced landing procedure is exactly the same as for day forced landing with a few additions as to lights:

a. Turn on all navigational and interior lights that will not blind the pilot and keep them on. They will burn for a time if the plane remains afloat, and may assist in attracting searching aircraft. They also will assist you in abandoning ship.

b. Switch on the landing lights. Judgment of height over water at night is difficult, however, and they may not help you much. Nor can you depend on the aneroid barometer if the airplane has been in flight long enough to get into a region of different barometric pressure. One way of telling how high you are is to lower the trailing antenna weight. If the radioman keeps his key clamped down and watches his ammeter, the current will drop when the antenna carries away as the weight touches the surface—and the radioman should immediately sing out to warn the pilot. He should then jump for his dunking station.

The radioman's dunking station should be as near as possible to his regular duty station.

DAY OR NIGHT

a. All hands take dunking stations as rapidly as possible in order to assist the pilot in determining trim. Make sure those underbody openings are closed and the upper escape hatches are open so there is no danger of their becoming jammed. (It isn't a good idea to open the upper escape hatches if you still have a chance of making base, as they create drag; but if you are going to dunk, brother, get 'em open FAST.) The well-dressed dunkeree also keeps on his helmet, flight clothing, and life jacket, but removes his parachute harness, unless it is the type where the single seat raft is directly attached.

b. The navigator calculates the estimated position of the landing and passes it to the radioman. Speed is more important than exact accuracy, if you are pressed for time. You can correct the report later if time is available. The navigator then throws overboard all classified publications in their weighted covers.

c. The radioman makes the prescribed distress calls, transmits the position received from the navigator, clamps down his key, and moves to his dunking station. Directives in the Fleet govern the transmission of distress calls, etc., and should be meticulously followed.

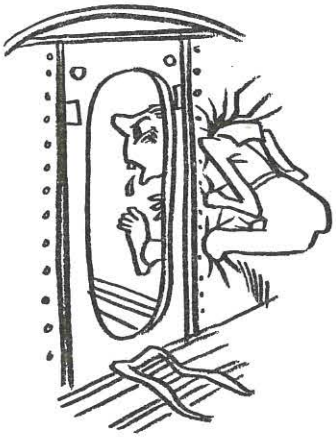
We're
getting
lower. . . . . .

Don't start unstowing the emergency gear or inflating the raft before you are down. Loss or damage will inevitably result. Remember, there is going to be a *real jolt!*

Say,
we
must
be
pretty
near . . .

The pilot is adequately protected against the impact by his safety belt and shoulder harness. The same applies to tail and upper turret gunners if they remain in their turrets with belts fastened, facing aft so that the impact comes against their backs. Other members of the crew sit down on the deck facing aft with *back and head* against a bulkhead, the hands clasped behind the head to cushion the shock, or lie athwartships against a bulkhead. A third method is to lie on the back, feet forward and well apart against a bulkhead. This

method is not as good as the others because of the danger of breaking an ankle, but may have to be used under certain circumstances. Avoid, if possible, dunking stations under and forward of closed turrets. Don't improvise a dunking method—these have been tested—yours might fail.



DUNKED!

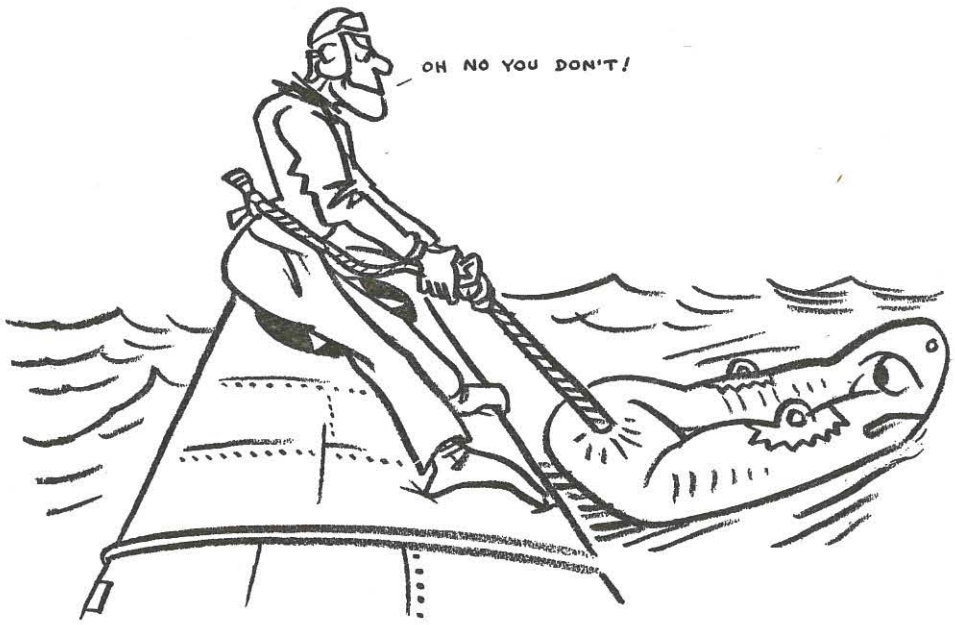
Here it is, dunkerees, first a light impact as the afterbody strikes the crest of a wave, then a heavy, final impact. Don't be fooled by the left lead; wait for the right cross. *Keep braced until the aircraft comes to rest.*

ARE YOU A QUICK-CHANGE ARTIST?

Remember the quick-change artists in old time vaudeville? They had to be fast and accurate—and so do you. You've got to change from aviators to raftsmen in a hurry. Be prepared for the sea to be a lot rougher than it appeared from aloft.

Your first job is to get the raft inflated. Even though you may have an automatic release fitted, man the manual release as soon as the airplane comes to rest (but not before). The automatic release may have been damaged. If you have the throw-out type raft, be sure, *before you take off*, that it is stowed convenient to the main emergency escape hatch where it can be reached and removed from the outside. There have been numerous cases where a man has had to dive under water to get the raft out of a sinking airplane. *Be absolutely sure the*

raft is lashed to you or to the plane by a line before you release it in the water. After inflation, an automatic raft remains attached to the airplane by a light painter which will part if the airplane sinks (although a knife is also provided in the raft.) Before you take off, be sure that it is so attached. *Never under any circumstances heave the raft overboard, inflated or not, before you land, and never cast it loose without a securing line.* It is highly buoyant and will be drifted



away by wind and swell much faster than you can go after it. The newest type rafts are equipped with a 10-foot retaining line, with a snap hook on the free end emerging from the carrying case near the CO_2 inflation handle. This snap hook, as you are informed by an instruction tag thereon, is to be snapped onto the D ring of your life jacket. You can then stop worrying about losing your raft before you're ready to climb aboard.

Normally, launch the raft to windward so it will drift down on the airplane and be convenient to you, but if there is wreckage, or anything which might puncture the fabric, launch it to leeward. If it has not already started to inflate automatically, inflate it manually. If there is anything wrong, such as a fouled line, or if the raft starts inflating upside down, clear it or right it from the wing of the airplane. If this doesn't work, put one man over the side—don't all jump in the water. One man is plenty if he's learned

HOW TO RIGHT AN OVERTURNED LIFE RAFT.

The principle of righting an overturned life raft, or an overturned anything else, is to push down on one side of it and then reach across and pull the other side over toward you. If your personal life raft has righting lines or the new righting handles on it, the job is a cinch.

Just push the near side of the raft down in the water with one hand, get a knee on it, and then pull the other side up and over with the righting line or handles. If your raft is not equipped with righting handles, and you have foolishly neglected to put on righting lines as called for in BuAer Technical Note 15–44, you can tie a line or even an article of clothing to that far life line for pulling purposes. If you're in a hurry and approximately eight feet tall, you can always just reach across and grasp that opposite life line with your powerful paw. This is best done near the bow of the raft, where it isn't quite so wide, and will never be necessary at all if you've had sense enough to make sure that your raft is equipped either with righting handles or righting lines.

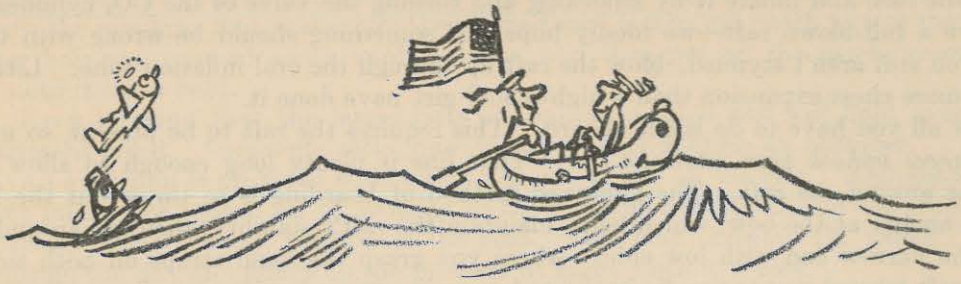
A landsman, a boot, or a summer boarder will leap heavily into a life raft, thereby either puncturing the fabric or capsizing it, but you, being a seaman, will lower yourself into it gently and square things away for your voyage. When boarding from the sea, use the life line (and the new boarding handles if your raft is equipped with them) and wriggle up over

the side as nearly horizontal as possible, using the swimming kick to help you. If you try to climb vertically as though you were climbing a wall, the raft may capsize and, very deservedly, crown you; or you may exhaust yourself to no purpose. The water will support and help you if you give it half a chance.

There is good clean fun to be had in watching a man fall down a hatchway or off a ladder and many a hearty horselaugh has gone up at the expense of a fat man stuck in an opening that is too small for his girth. Just a little whisper as a reminder. Have you tried going out the escape hatch of your plane with your flying gear on and your life jacket *fully inflated?* Try it now, on the ground and in no hurry. Then you will know whether or not to inflate your jacket *before* or *after* using the hatch. If you are the beanpole type, by all means inflate it beforehand, but be certain you will clear. In any event, inflate it as soon as practicable.

Take what gear and supplies you have decided beforehand to bring with you in addition to the regular emergency kit. Take at least one parachute along; its silk and shroud lines are going to come in mighty handy. Board the raft rapidly and carefully. The pilot should muster the crew. Check quickly that you have everything aboard that you are going to need.

If your plane remains afloat you probably will want to stay close to it, secured with a light line—it's easier for a searching craft to see a plane than a small raft. But the time finally



will come when the plane gives up the ghost and goes under. Then there's nothing left to do but "Shove off, Coxswain!" A small, but genuine, United States Naval vessel has started a cruise to safety.

THE CATERPILLAR DIVE.

The most carefree class of dunkerees are the lads who do the caterpillar dive—otherwise, bailing out. They don't have to worry about the plane and as for the raft . . . they are in the same category as the turtle who carries his home on his back while they carry theirs on their back and backside. Yet, even if you are one of this group, there is a little dope you should have as you float down to set up housekeeping.

Be positive that *both* the raft and its furnishings are with you and securely attached to you. You can't go back after them, you know. First, the raft should be between you and your seat-type parachute, neatly folded in its case and comfortably cushioning your *derriere*—rear end, to you. Before taking a header into the blue you owe it to yourself to make sure that the snap-ring fastener on the raft retaining line is clipped on the "D" ring of your life jacket. This is vital because that line becomes the only link between YOU and the RAFT, once you are in the water. Second, your assortment of ocean-going housekeeping equipment, ranging from fishing tackle to sunburn lotion, should be riding piggy-back in your STANDARD BACK PAD EMERGENCY KIT, firmly latched to your person by a shoulder harness and chest strap.

Undoubtedly you'll look like Saint Nick on an unusually heavy Christmas Eve as you and your impedimenta hit the nylon. But you'll be ready for what is ahead.

You're going down! You, your pararaft, and emergency kit. And here, one big DON'T. Don't try to inflate the raft in the air. Possibly it can be done but don't try. Wait till you are down and organized. Even then don't inflate either your raft or your jacket if you are

being strafed because it will make you a more conspicuous target. Normal procedure, however, is to inflate your life jacket, then recover the packaged raft by the retaining line, remove it from the case and inflate it by unlocking and turning the valve of the CO_2 cylinder. You now have a full-blown raft—we fondly hope. If something should be wrong with the CO_2 bottle, you still aren't stymied; blow the raft up through the oral inflation tube. Little guys with no more chest expansion than a high-school girl have done it.

Now all you have to do is get aboard. This requires the raft to be present, so *under no circumstances unhook your retaining line.* That line is plenty long enough to allow you to maneuver around the raft. The approved method of boarding is to throw out the bucket-type sea anchor at the bow, which helps maintain the raft's stability, then get around to the stern—the narrow end with low sides—where you grasp the hand straps on both sides and pull the raft toward you as you lie in the water, really swimming into it. Some pilots seeking an easier way, as pilots will, have found they could unfold the deflated raft, slide into the middle of it, and *then* turn the inflating valve.

A last word about that retaining line: Keep attached to it, even on the raft. Reports are skimpy about how bitter it is to watch a raft skipping away across the waves after dumping its rider because few if any who let their rafts get away have come back to tell about it.

ON A RAFT?

Well, why not? You're there anyway, whether it's a one-man job or one of the big ones that carry seven. Wherever you are, it keeps you afloat, for rafts are probably the most seaworthy craft over invented. However, certain things must be kept in mind:

1. Avoid wreckage or anything that might put a hole in the fabric.
2. Avoid handling knives or sharp tools near the fabric for the same reason and be careful of metal buttons, the sides of shoes, etc., which might wear it thin.

3. Inspect carefully and periodically for air leaks. If you find one, plug it immediately with one of the wood or moulded rubber plugs, or one of the new clamp type plugs if your raft is equipped with them. Then get out the patching kit, scrape the rubber around the leak with the roughing tool, make sure the scraped spot is dry, cut patch to size (large enough to cover hole and scraped area), apply cement, and then put on the patch, pressing down firmly until it takes hold.

4. Keep in mind that the larger rafts are compartmented and will float even with one compartment holed. Parachute rafts, however, have only a single air chamber.

5. An air pump is provided with which you can pump up the raft. (One-man pararafts are kept inflated or topped off by blowing in the oral inflation tube.) In the tropics the air may expand inside the raft because of the heat. This may threaten the seams. Valve off some during the day and pump up the pressure at night when it is cool.

THAT LITTLE FLAT HOME IN THE DRINK.

Raft equipment, while standardized, varies with the type of raft which is why you must know, before you take off, just where your gear is stowed and what it is for. In the larger rafts (two- to seven-man capacity) there usually are three pockets, one of which is detachable for use as a baler. Inside the pockets you will be overjoyed to find an assortment of items listed below. The waterproof fabric container for emergency equipment which is usually attached to the raft by a ten-foot line (but don't depend on it!) contains many additional very useful gadgets.

Don't anticipate a bonanza of goodies when you open up the one-man pararaft or you'll be sorely disappointed. Pararaft equipment is very scanty because it has to be, but the back pad emergency kit is another story. It's as full of surprises as a Christmas stocking and can do much to make a solo voyage thoroughly successful.

Here is a general list of what the rafts and kits should contain:

Large Rafts

Articles in raft:

- Three oars—one for mast
- Hand pump
- Paulin (to be used as sail, etc.)
- Fishing kit (everything but live worms!)
- Combination compass and waterproof match box
- H–C smoke grenade holding clamp
- Signaling mirror
- Jackknife
- Signaling whistle
- Bailing sponge(s)
- Raft repair kit
- Four sets of leak plugs
- Hammock-bed(s)—maybe
- Fish spear—in handle of oar
- Line, 25 feet or more

Large Rafts—Continued

Articles in equipment kit:
- First aid kit(s)
- Three units raft tablet rations per man
- One can of drinking water per man
- One drinking water kit per man (for mixing your own)
- Water storage bags (two or four, depending on size of raft)
- Three life jacket sea dye markers
- Two H–C smoke grenades
- Pyrotechnic projector and six red Very cartridges
- One mosquito headnet per man
- Survival instruction booklet (for those long winter evenings!)

Articles in back pad kit:
- Preservative oil
- Sunburn ointment
- Poncho raft cover (*head* through the hole)
- Pair of work gloves
- Mosquito headnet
- Jungle knife
- Burning glass, to build fires and study flora and fauna
- Signaling mirror
- Fishing kit
- Two cans of water
- Three cans of emergency ration
- Compass and waterproof matchbox
- First-aid kits
- Pyrotechnic projector and Very cartridges
- Small knife and sharpening stone
- Line, 25 feet
- Salt tablets, adhesive tape, and even safety pins!
- Whistle, to attract passing mermaids, ships, etc.
- Survival instruction booklet and pencil to make notes.

One-Man Pararaft

Articles in raft:
- Two hand paddles
- Can of sea marker dye
- First-aid kit
- Can of water
- Raft repair kit
- Sea anchor, Bailing cup } Secured by line

All members of a plane crew should have examined every one of these articles during a drill so they know just what they are and where they are.

LASH AND STOW!

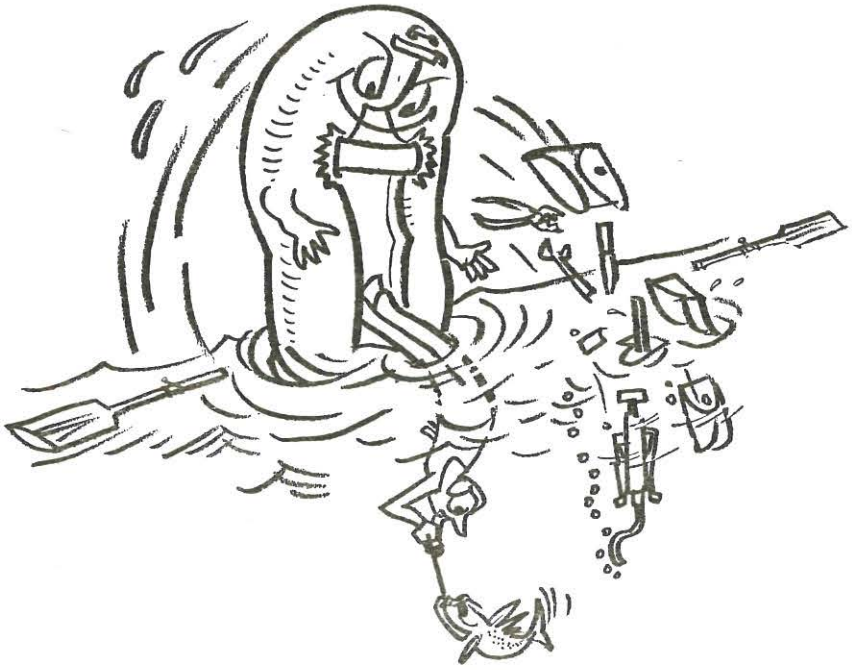
Don't start rubbing your hands, though, when you read the equipment list. Grab a line instead and lash everything in place. For rafts, owing to their buoyancy are also very unstable and liable to capsize. *What is not lashed is as good as lost overboard.*

Keep five rules in mind:

1. Keep everything lashed.
2. Keep the pockets in the raft buttoned, except when actually removing an article.
3. Watch the trim at all times.
4. If capsized, one man should get on the weather side to keep her from going over again as the others climb aboard from the lee side.

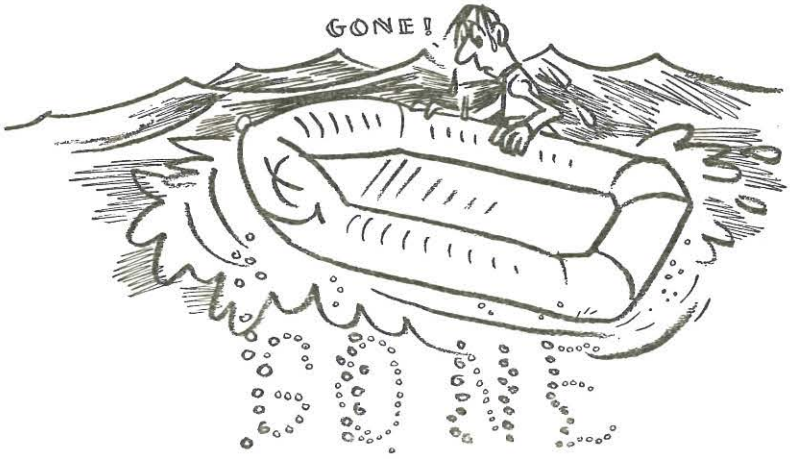
If there is more than one man on the raft, the crew should stand watches. This puts someone on the alert at all times for such events as sighting vessels, changes of weather, lines beginning to chafe, leaks, etc. The raft should be lashed to the man on watch with not less than 10 feet of line to keep it from drifting away in the event it should overturn. *Under no*

circumstances, however, lash a man directly to the raft with less than ten feet of scope. If it were to capsize under these conditions, he might drown before the raft could be righted.



No, that fifth rule hasn't been forgotten. It's the same as the first: Keep everything lashed.

Lash, brothers, lash with care,
For what ain't lashed,
Just won't be there.



"QUICK, HENRY, YOUR SHIRT!"

To go back, suppose, though, that you consider that you have a reasonable chance to keep your plane afloat or you belong to the aristocracy of dunkerees and have a floatplane or flying boat. In all types, rig a sea anchor. If the plane is not already so equipped, improvise one. A parachute will do. Stuff any holes full of clothes or other leak delaying materials (Where's that shirt?) or else get a patch over them. Failing this, try to keep the hole above water by dropping the opposite wing.

With a wing float holed, taxi with the damaged float out of the water. In a calm this can be done by turning in circles with the damaged float out of the water, the old beetle-on-the-pin technique, until you can get somebody on the opposite wing. If there is a wind, do not circle but cock the plane across the wind in order to keep the damaged float into it. The wind under the wing will assist in keeping the float out of the water. If the sea is smooth, you can make a power landing and taxi forward at sufficient speed to "stay on the step" until you can get a man out on that opposite wing. If you're carrying bombs under the wings, jettison the bomb on the side of the holed wing float.

In all cases, have your raft ready as soon as you come to a stop and be prepared to abandon ship. Be sure it is in all respects ready to receive you. Beyond a certain point (and there you must use your own judgment) you are much safer on a good, buoyant raft, no matter how small, than you are on a waterlogged and sinking plane, no matter how large.

SEA ANCHORS AWEIGH!

Stay near your plane until it sinks in order that you may be sighted more easily, then shove off. Study your chart. Never mind how far it is to land. Patrol planes and convoys probably will pick you up, but the essential thing is to have an objective and be *determined* to make it. Fight your way ashore and never give up. Then, in later years, when you are

elderly and irascible, you will fully understand how the landsman's remark, "They finally drifted ashore," can cause rising blood pressure and hardening of the arteries.

Rafts can be both sailed and rowed. Oars of a jointed type are provided which will serve also as a mast. To erect this, take the center section of one oar and fit it into the other. In earlier models the CO_2 bottle is mounted at the bow and the bottle is removed and its container is used as a mast holder. However, it was found that in some cases the bottle could not be removed with the tools available; so newer models mount the CO_2 bottle amidships and have a reinforced mast holder in the bow into which the oar may be stepped. Make shrouds either from the shroud lines of your parachute or from the line in the fishing kit (you have a full 100 feet there and probably won't need it all to fish with). Rig the sail either from the sail cloth provided (we are going to talk more about that sail cloth or paulin, a 54-inch square of water-repellent material) or from a double or triple thickness of parachute silk. Do not belay the foot of the sail but secure one end so you can let it go in a hurry in the event of a squall. Sit to windward of the sail so it won't pin you under if you capsize.

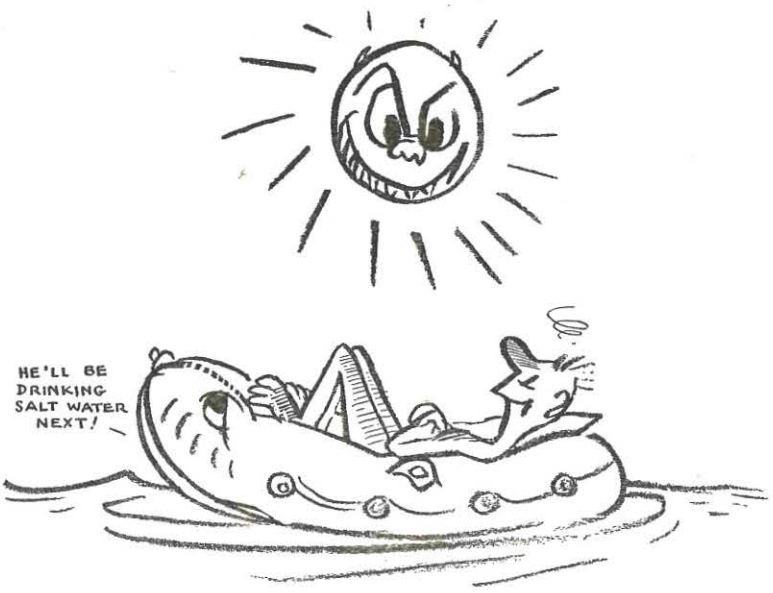
Even if you can't get a sail rigged, rafts will, to some extent, sail themselves because of their flat and smooth bottoms with comparatively high freeboards. They usually remain lengthwise of the trough and show little tendency to yaw. You can take advantage of this characteristic by letting her drift if the wind is in the right direction and checking the drift as much as you can with a sea anchor when the wind shifts and opposes your desired track.

If your raft is a new one it will be provided with a cone-type sea anchor, attached at the bow with a 25-foot line and stowed so that it will fall into the water when the raft is inflated. Watch the line as well as the raft for chafing. If the line starts to chafe, wrap it with cloth from your shirt, etc. The sea anchor will not only check your drift, but will hold the raft bow on into a heavy sea, thus reducing the danger of capsizing.

If your raft is not equipped with a sea anchor, rig one. A sea anchor can be made from any object that will float partly submerged—a piece of driftwood, a life jacket, a canvas bucket, etc. It's a good idea to rig your sea anchor with 25 feet or more of line from your parachute shrouds, rather than to use the long line in the life-raft pocket. Then if the sea anchor carries away in a heavy sea, you'll still have a long line ready at hand to rig a new anchor without delay. Simply bend onto the long line the first thing that comes to hand that will float partly submerged, and pay it out (on at least 25 feet of line).

ARE YOU HOT-HEADED?

Have you got cold feet? No; this isn't a course in self-analysis that has crept in by mistake. It's the old-time medicine-show barker bellowing that if you have any of these interesting symptoms then take . . . *precautions.*



Sunburn and windburn are formidable enemies which can cause serious toxic reactions. Your clothes protect you against both of these and should not be discarded even in the hottest climates. If you have a couple of safety pins in your kit, use them to protect your shins from sunburn by pinning the tops of your socks to the bottom of your pant legs. Sunburn-preventive ointment, if available, should be applied to those parts of your body not covered with clothing, not forgetting the nose, lips, and neck. If the water and air temperature is high, splash or pour sea water over your clothes and body. The evaporation of the water will cool you off. DON'T dunk yourself over the side because the effort of paddling around and climbing back on the raft uses up reserve energy. Improvise head covering or spread a parachute as an awning.

Your most serious adversary in cool waters is the effect of cold wind and water upon your body. Under such conditions, leave on all your clothing, dry or wet, save when a favorable moment for drying some of it is encountered. Great pains should be taken to dry out wet stockings and footgear whenever possible in order to reduce chances of the injury due to cold and wet known as "immersion foot." The lacings of footgear should be loosened after you have boarded your raft, and if later the feet become swollen and the footgear feel tight, the boots or shoes should be removed. (Do not throw them away—you'll need them when you get ashore). Exercise your toes from time to time to increase circulation of blood.

Dunkarees who have never been airsick sometimes become seasick in a raft. Seasickness is serious because it may mean loss of body water through vomiting or may so prostrate the

victim that he is unable to operate signaling devices. The first-aid kits of rafts are now being provided with a seasickness-preventive. If there is a sea running when you board your raft, take the preventive immediately according to the directions supplied with it.

DON'T COME IN WHEN IT RAINS.

Dehydration, or the drying up of body moisture, is the chief difficulty facing the shipwrecked on a long cruise. Your system has to have a certain amount of water to keep going; if the intake isn't enough to balance outgo, the difference comes out of body tissues. While the kidneys continue to function to carry off wastes, bowel movements are generally few, even one a month being considered normal under these circumstances.

You can do many things on a raft to keep from becoming like an old cavalry boot in appearance and composition. Most important, see that your raft and emergency pack has its allotted number of cans of drinking water, paulin or sailcloth for collecting rain water, and

kits for de-salting sea water. The Navy is now equipping its life rafts with these kits, marvelous little gadgets that can turn the briniest sea water into something better—in this case—than the finest vintage champagne.

Even with these sources of drinkable H_2O, it behooves raftsmen to become ardent water conservationists. Men adequately supplied with water have lived over 30 days without food; without water, 10 days is likely to be the limit. Unless you manage your personal waterworks properly in hot weather, your body may waste as much as a quart and a half of precious moisture daily as sweat and an additional amount as urine. Good management is just like a rest cure. Be lazy! Don't move a muscle in unnecessary exercise because it uses up body moisture.

Rig your awning to protect you from the sun but not to interfere with the breeze. Don't try to be a military fashion plate in hot climates. Shuck off—but don't throw away—all clothes except a head covering, shirt, pants, and socks. Stay in the breeze as much as possible and keep your clothes moist with sea water during the day, letting them dry only at evening or when you are chilly.

A smart dunkaree doesn't gulp down a lot of water the first day or so, even if there is plenty aboard. He rations to strike a reasonable balance between income and outgo. Presumably you were a pretty well hydrated specimen and were foresighted enough to take a drink of water before starting on this mission. You should be able to get through the first 24 hours without drinking any water—and that's a good way to start. Thereafter, drink about 24 ounces a day if the supply is ample, and 16 ounces if it is limited. An ordinary coffee cup holds 8 ounces. Should your water supply get down to 10 ounces, don't drink it; merely moisten your mouth and throat with occasional sips so you can pray for rain.

With one thing and another you should be able to lick the old bugaboo of thirst. But saving every bit of fresh water is still of paramount importance. *So don't come in when it rains.* Get to work! When you see a rain squall approaching, wash the dry salt off of your "raincatcher" (the 54-inch square of waterproof fabric) with sea water. If you don't have a sailcloth, soak up the rain with your bailing sponges or any absorbent cloth and wring it out into the storage bags. And this is the time to prove the capacity for liquids about which you've bragged so much. Drink your fill—slowly—over an hour or so. Build up the old tissues. Next day return to your usual 16 to 24 ounces. Even if your rain water has become contaminated with sea water and tastes salty, go ahead and drink it unless it causes diarrhea or vomiting when taken in small amounts.

DON'T DRINK SEA WATER.

This is no time to become an old salt. Some raftsmen have survived after imbibing straight sea water—but evidence indicates they came through *despite* this dangerous grog. Recent experiments by American and English scientists fully confirm the old mariners' belief that this is a perilous practice, causing intestinal upsets and taking more moisture out of the body than it brings in.

Don't be taken in, either, by the story that you can catch any convenient fish and make a veritable fountain out of it by "wringing" water from it with your shirttail. Navy researchers have tried this and report sadly that it usually can't be done. Furthermore, fish juice, even if it could be extracted may not be a satisfactory substitute for water, being high in protein and salt. So consider fish as food only, and then to be eaten with caution. Flesh and liver of fish, turtle, and birds are nutritious, but too much of them, when water is scarce, causes waste of vital body moisture in the form of excess urine. Water is the most important, so if you have 24 ounces or less of water daily, eat only about 5 ounces (ten 1-inch cubes) daily of fish or meat, and eat it as soon as it is caught, when still moist. If the fish is shark, skate, ray, or dogfish, eat only half as much. Eat no *dried* flesh nor entrails unless you can drink a quart of water daily.

Your raft probably will be equipped with three or more small cans of a tablet emergency ration per man. Eat at least half the contents of a can each day to help maintain your strength.

SHARKS! . . .

Sharks should be treated with respect, but they're nothing to work yourself up into a nervous tizzy over. For instance, if you're in shark-infested waters, don't do foolish things such as trailing your hands or feet over the side. If the raft capsizes and you go overboard

involuntarily, splash and kick while getting back aboard. Sharks are cowardly and are puzzled by such tactics, but don't depend on their remaining puzzled too long. In waters where sharks may occur, whether or not you have seen any, avoid getting blood into the water. Wash any wounds inside the raft, and watch out for fish blood when cleaning fish. (Complete instructions on how to meet a shark socially will be found in *Shark Sense*.)

SPORTSMAN'S DEPARTMENT

Catch-as-Catch-Can

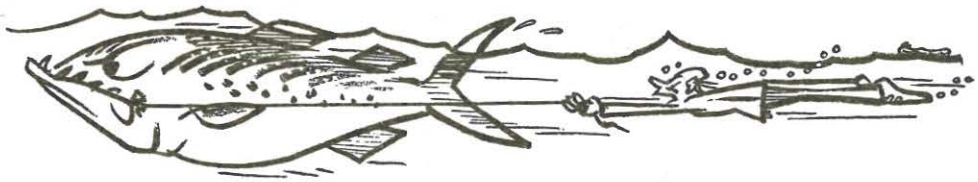
Among the many jolly playthings on your life raft you'll find a carefully planned fishing kit. This should be good news to all pilots afflicted with the annoying habit of eating.

The kit contains lines, strips of pork bait, sinkers, a mackerel jig, a grapple, a honing stone with float handle, various sizes of hooks, a 12-inch dip net, and instruction sheets printed on waterproof paper. In addition, you will find a very serviceable fish spear stowed in the end of

one of your oars. The complete outfit is designed for serious deep-sea angling, and provides everything necessary to "live off the fat of the sea."

As to the use of the kit:

1. Don't jerk the bait away from little fish just because you want to win the Tarpon Prize for 1944–45. The big fellows may break the line, carry off the bait, gash your hands, or upset the boat. Stick to the small fry!



2. If sharks are in the vicinity stop fishing. If they don't take the hint and move on, remember that their nose and gills are most tender spots and if you hit them with an oar well above the belt it will send them on their way.

3. Don't encourage your bait to hide in seaweed. Keep it clean!

4. Keep part of the first bird or fish you catch to be used for bait. Use live bait whenever possible, saving the pork rind for emergencies when there is nothing else available. If there is no bait, try a white button, or a narrow strip of leather or canvas. The "school" idiot may come along and be taken in.

5. Remember, don't overload your sea-food platter if you don't have a liberal supply of water. And avoid eating poisonous fish—*sea* snakes, parrot fish, and puffers are in this non gustable category. Of course, you need not be too high-minded about passing these along to their edible brethren in the form of bait.

6. Dried fish can be kept from the day when your luck is good against the day they won't bite. Cut the meat in narrow strips and dry it in the sun. *Caution:* Don't eat dried fish unless you have plenty of water.

7. The meat, blood, and juice of sea turtles are good to eat, and a turtle can be caught by throwing a grapple or fishhook across it where the hook will catch in the leg or neck or in the edge of the shell. Or usual antitank procedure can be followed. The hot sun

will bring out clear oil from turtle fat and this is good food even when your daily ration of water is small. Turtle fishermen are warned, however, that even after a turtle's head is cut off the jaws may bite and the claws may inflict painful scratches.

THE CHAMELEON TURN.

Rafts are provided with several means of signaling rescue craft, including a reflector, smoke grenades, and fluorescein dye. This latter makes a conspicuous stain on the water, as has already been said, but the stain will last only a few hours and must therefore be used with discretion. As a matter of fact, nothing calls for better judgment than when and where to use signals. If you use up your equipment on the off-chance of somebody seeing you, perhaps you are forfeiting a real chance of rescue a few hours later. *Be sure, too, that you are signaling a friend and not an enemy.*

If an enemy plane appears, the time has come for you to do a chameleon turn, and hope he doesn't sight you. That sailcloth we have referred to so frequently, is orange-yellow on

one side and dark blue on the other. Change colors quick. Yank the sail down and spread it over you, sea-blue side up. If it doesn't cover the whole raft, hang clothes over the exposed

parts or cover them with your bodies so the orange-yellow won't show up. If he strafes you, go over the side and remember that the raft will still float with one compartment holed. But be certain everyone hangs on to the raft to be sure it doesn't drift out of reach.

REAL SEAGOING.

That's the way you've got to be on a raft and in the plane before it lands at sea. Only by real sea discipline will you come through. Discipline means ordered cooperation. Rations must be strictly meted out and consumed as issued, no "credits" being allowed for unused portions. Watches must be stood responsibly and faithfully. The Navy expects you to live up to its tradition.

COMING ASHORE.

When you sight land, be wary of the surf. Avoid it or stay offshore, if you can, until picked up. If you do have to go through it, try to cling to the raft and hope for the best. Strike your sail and awnings to prevent becoming tangled up in them. Pay your sea anchor out with all the line you have attached to it. It may save you from being catapulted end over end.

You're going to realize, when you hit the beach at last, that what carried you through was:

1. Determination.
2. Drill.
3. Discipline.

The final and all inclusive advice is to keep using your imagination and common sense. Many other men before you have saved their lives by doing just that.

CHECK-OFF LIST

1. Is the raft in good condition?
2. Is the CO_2 inflating cylinder full?
3. Is there a full allowance of emergency equipment, in accordance with latest technical notes, stowed in the pockets of the raft?
4. Is the waterproof fabric container for emergency equipment attached to the raft by a 10-foot line?
5. Does this container carry the full allowance of equipment in accordance with the latest technical notes?
6. Check for unauthorized gear that might prevent raft from inflating properly.
7. Are life lines and righting lines clear so they will not foul when the raft inflates?
8. Are automatic and manual raft releases in proper condition?
9. DO YOU KNOW YOUR LIFE RAFT DRILL?

(CUT ALONG LINE)

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